PUEBLO OF LAGUNA
COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE RECLAMATION OF THE JACKPILE-PAGUATE URANIUM MINE

September, 1985

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General Comments

Overall, the Draft Environmental Impact Statement (DEIS) prepared by the U.S. Department of Interior (DOI) on the Jackpile-Paguate Project represents a significant effort on the part of the preparers and makes a large contribution towards the resolution of the many issues and concerns that have been raised on the project. However, there are a number of areas that require additional effort before the DOI can select a preferred alternative and issue a Record of Decision.

Among the unresolved issues are: compensation for damage to homes and other structures in the Village of Paguate, discrepancies in the projected ground water recovery levels, providing a mechanism for the long-term maintenance of the mine site, and identifying an appropriate design life for the reclamation alternatives. Other issues which the DEIS has not adequately addressed are: land use impacts, air quality impacts during reclamation, costs, revegetation success, and drainage of the reclaimed site.

Our specific comments are identified below.

Long-Term Stability

The primary goal of reclamation, as stated on page 1-10 of the DEIS, is to stabilize the mine site. However, the DEIS does not contain a discussion of the design life for any of the reclamation alternatives. At a minimum, reclamation should be designed to withstand 100-year rainfall, flood, and earthquake events. Any of these major events could damage the site. For

example, a major flood in the Rio Moguino would strip away the vegetation, soil, and cover of dumps S, T, and V. The hazardous material in these dumps would then be exposed and subject to erosion.

Additional environmental components which would become unstable under any of the reclamation alternatives addressed in the EIS are as follows:

1. Open Pits

   Salts will build up in the soils of the undrained pits and destroy the vegetation.

2. Highwalls

   Even though the highwalls may be scaled and partially sloped during reclamation, rock falls will occur. The fractures, joints and blasting cracks will be widened and lengthened by erosion and sections of the highwalls will become unstable. The highwalls created by blasting during mining operations are not nearly as stable as the cliffs formed over thousands of years by natural forces. Routine rescaling and resloping of portions of the highwalls will be necessary to eliminate the hazards created.

3. Waste Pile Slopes

   Even if the waste piles are sloped to 3:1 they have the potential to erode. As drainage from the top of the dumps cuts channels in the

slopes, the hazardous materials in the dumps will be exposed and subject to erosion. Included in this material are uranium, radium, thorium, polonium, and radon as well as many heavy metals. Erosion of the dumps would cause these elements to enter the hydrologic, atmospheric and food chain exposure pathways. This is likely to occur to a very limited degree almost immediately after reclamation and could become extensive over a period of several decades if it is not mitigated.

Piping will also occur on all of the waste dumps and would result in extensive erosion without routine maintenance.

The only effective ways to mitigate these long-term impacts would be to design the reclamation with a very long design life, or to establish a mechanism for the long-term monitoring and maintenance of the site such as providing the Pueblo with the financial resources to establish a long-term monitoring and maintenance program.

Long-Term Monitoring

As previously stated, the long-term stability of the site would be uncertain under any of the reclamation alternatives addressed in the DEIS. Since the project involves the isolation and stabilization of radioactive material, it is imperative that long-term, systematic monitoring of the success of reclamation and the stability of the site be implemented.

The longest monitoring period identified in the DEIS for the DOI alternatives is 5 years, which is discussed only in reference to monitoring

revegetation success. Monitoring of such a short duration would not be useful in evaluating the accuracy of the ground water recovery projections or the success of the long-term erosion protection measures.

A long-term monitoring program should be included in each of the alternatives and should include monitoring sheet wash and rill erosion, flood impacts, ground water recovery levels, highwall stability, waste pile slope stability, and vegetation density. The reclamation alternatives should be modified to include this long-term monitoring.

Long-Term Maintenance

The mining activities have altered the chemical and physical properties of the rock at the mine site and made them very susceptible to wind and water erosion. The waste rock also contains toxic elements such as selenium (DOI, 1984) and the site contains public safety hazards. As previously discussed, the reclamation alternatives addressed in the DEIS do not provide for long-term stability of the site. In order to protect the public from these hazards and provide for long-term productive use of the site, the mine site will require long-term maintenance regardless of which reclamation alternative is selected. Maintenance activities that will be required include:

1. Repair of erosion control berms.
2. Scaling of highwalls that become unstable.
3. Repair of arroyo stabilization structures.
4. Regrading and revegetating eroded areas.
5. Replacement and repair of fencing.

6. Replacement of soils in the open pits that become contaminated with salts.
7. Adding additional backfill if the ground water rises higher than projected.
8. Repairing the impacts of floods.

None of the reclamation alternatives evaluated in the DEIS contain provisions for the long-term maintenance of the reclaimed site and should be modified accordingly.

Site Drainage

The DEIS does not identify how surface runoff would be directed off of the mine site. All of the alternatives include directing surface runoff away from the outer surface of the waste dumps but do not discuss how this runoff would be directed off of the site to the natural drainages. With the information provided, it appears that much of the mine site (not just the open pits) would be internally draining basins. The alternatives should be designed to direct surface water off of the mine site to the maximum extent achievable to prevent the buildup of salts in the soils and the associated denuding of vegetation.

The EIS should contain a grading plan for each of the reclamation alternatives.

The waste dump slopes previously revegetated (dumps S, T, O, D, E, F) are showing signs of accelerated erosion less than 10 years after reclamation.

This is strong evidence that the slopes steeper than 3:1 are too steep to inhibit erosion to an acceptable level. The DOI should require all slopes, including those previously reclaimed, be reduced to a slope of no greater than 3:1.

Blast Damage

One of the key issues and concerns of the project as stated on page 1-13 of the preliminary DEIS is the "structural damage from blasting during the mining operations to the homes in Paguate." This issue should be addressed in the DEIS. In addition, the DOI should address the issue of cosmetic damage to the homes in Paguate since cosmetic damage can be very costly to repair.

The DOI should collect site-specific data on the attenuation of ground vibrations between the mine site and the Village of Paguate and site-specific data on the effects of varying velocities of ground vibration on the buildings in Paguate. The extrapolation of ground vibrations from data collected at the mine site and the comparison of the effects of blasting on frame structures are not accurate methods of assessing the damage in the Village of Paguate.

The DOI's evaluation of the blast damage issue should address the following issues:

1. The operator continuously performed structural and cosmetic repairs to the homes in Paguate during mining operations (DOI, 1985).

2. The U.S. Bureau of Mines recommended that blasting during reclamation operations be limited to produce a maximum ground vibration of

0.2 inches/second (DOI, 1984) which is less than one tenth of the strength of some of the blasts that occurred during mining operations (Oriard, 1982).

3. The residents of Paguate repeatedly experienced significant shaking of their homes (DOI, 1985).

4. The U.S. Bureau of Mines has stated that ground vibrations as low as 0.5 inches/second could damage the homes in Paguate (DOI, 1984), and blasts during mining operations exceeded this level (Oriard, 1982).

5. The operator did not monitor airblasts which also could have caused damage. The U.S. Bureau of Mines has recommended that blasting not be allowed during reclamation operations when the wind is blowing from the east to protect the Paguate homes from airblast damage (DOI, 1984). Blasting during mining operations occurred regardless of the wind direction.

6. The DOI did not collect any data to verify the accuracy of Anaconda's seismic data.

7. Studies have not been performed to evaluate the effects of blasting over an extensive period of time such as the 30 years that blasting occurred at the Jackpile-Paguate Mine.

8. The operator did not collect seismic data at locations where the damages were being assessed in Paguate. Instead, data was collected

around the periphery of the mine site. The site-specific ground conditions between Paguate and the seismograph locations were not evaluated during the extrapolation of ground velocities between the mine site and Paguate (Oriard, 1982).

9. The particle velocity standard of 2.0 inches/second used by the DOI and Anaconda is a design standard not a performance standard (30 CFR Parts 175 through 817).

10. The houses in Paguate are primarily of adobe and stone construction which is much more susceptible to blast damage than the frame structures used in the U.S. Bureau of Mines studies referenced in the PDEIS.

11. No data is available on the size of the blasts that occurred prior to 1966. These blasts may have been strong enough to cause structural damage (Oriard, 1982).

Where blast damage is a potential problem, it is standard industry practice to conduct a survey of the pre-blast condition of the structures near the mine, design the blast to account for site-specific conditions, monitor ground vibration and airblast at the structures of greatest concern and compensate the owners of the damaged structures.

Hydrology

The hydrology sections are not sufficiently complete to enable a thorough review. Additional information which should be included in the EIS include:

1. Location of monitoring wells.

2. Description of the ground water models and calibration procedures.

3. A map of the projected post-reclamation potentiometric surface.

4. Post-reclamation grading plan.

5. A map showing the existing potentiometric surface.

6. Location of surface water samples.

7. Location, composition, and dimensions of the cut-off wall proposed by Anaconda.

The DEIS should explain why the Dames and Moore modeling of the ground water recovery levels was used to assess ground water impacts instead of using the ground water modeling performed by Argonne National Laboratory (ANL). The ANL modeling was performed for the EIS Task Force and represents an independent analysis of the recovery levels. The ANL modeling predicted a significantly higher recovery level than did Anaconda's modeling and this difference may be the result of selecting more realistic input parameters (ANL, 1981).

The applicant's proposal includes backfilling to only three feet above the projected ground water recovery level. The U.S. Water Resources Division's evaluation of Dames and Moore's ground water model showed that modest

adjustments in the model input parameters resulted in recovery levels greater than 50 feet above Dames and Moore's projections (USGS, no date). With such a wide variation in the estimated recovery level, a three-foot confidence level is not appropriate.

The DOI monitor alternative attempts to resolve the disagreement over the ground water recovery levels by including provisions to monitor the recovery level and add fill if the recovery level is higher than estimated. Page 3-27 of the DEIS states that 30, 150, and 300 years would be required for the ground water to reach its maximum height in the North Paguate, South Paguate, and Jackpile pits, respectively. Many decades of monitoring would be required before a determination could be made on the accuracy of estimated recovery levels and there is no guarantee that the applicant would be available or have the financial resources to add additional backfill in the future. The DOE should consider the establishment of a ground water mitigation fund which would be invested to earn interest and would be used only to add backfill to the pits if the ground water rose to a level higher than predicted by Dames and Moore.

If the ground water recovers to the level projected by Dames and Moore it will be only three feet below the surface. Capillary action of the ground water could transport salts from the ground water into the upper layers of soils. Upon the evaporation of the water that has risen by capillary action, the salts will remain in the soils and prevent the growth of all but the most salt-resistant plants. The backfill level should be at least 10 feet above the final ground water recovery level to prevent this salt buildup.

In order for a cut-off wall to be effective, it must be keyed into material with a very low permeability. Neither the DOI nor the applicant is proposing to key the cut-off wall into the shale that underlies the Jackpile Sandstone and the DEIS should evaluate the effectiveness of the cut-off wall under these conditions.

In summary, the ground water recovery and backfill level issues remain unresolved.

Costs

The cost items listed in Table 1-6 do not appear to contain many items which would be required for each of the alternatives. Among the major items for which costs have not been presented are:

1. Removal of contaminated soils along roads and around the surface facilities.

2. Construction and environmental management.

3. Compaction of the cut off wall.

4. Placement of cover on the waste dumps and within the area of the pit that would not be backfilled.

5. Insurance and bonding.

6. Environmental data collection and analysis.

7. Grading and seeding roads on Black Oak Mesa.

8. Overall site contouring to provide drainage.

9. Sloping interior waste dumps.

10. Treatment and discharge of pit water.

11. Mobilization and site preparation.

12. Decontamination or demolition of surface facilities.

13. Detailed planning and engineering.

14. Preparation of engineering designs.

15. Long-term monitoring and maintenance.

16. Contingencies for reclamation measures which cannot be precisely defined at this time.

The inclusion of these items in the cost analysis would provide a more accurate assessment of the total project-related costs.

The two DOI proposals include backfilling the upgradient portion of the North Paguate pit to a level approximately 65 feet above the level proposed by the applicant (page 1-13). In addition, the other pits would be backfilled to

a level 40 to 70 feet above the level proposed with an estimated 19 million cubic yards of material (page 1-13). However, the costs of backfilling under the DOI alternatives are only about $1 million more than under the applicant's proposal. (Table 1-6). There are apparently significant errors in either the costs or the volumes presented in the EIS and these errors should be corrected in the Final EIS.

The volume of material that must be moved during the resloping of waste dumps differs greatly between the applicant's proposal and the two DOI alternatives; however, the costs are shown to be the same (Table 1-6). This discrepancy should be resolved in the Final EIS.

Table 1-6 states that the majority of the excess material from resloping the waste dumps will be placed into the pits. However, much of this resloping will be performed with graders and dozers which is much more cost-effective than relocating all of the material by truck to the pits.

In general, the DEIS apparently has errors in the volume and cost calculations and DOI should recalculate these items for the Final EIS. In addition, the DEIS should provide greater detail on the unit costs used and how the volumes were calculated, as well as for a more detailed breakdown of the individual costs.

Radiation

The projection of fatalities due to cancer of the lung, digestive tract, and other organs is based on a static population; however, the population of

the region is increasing and the radiological health impacts should be recalculated using a continually increasing population.

The risk of contracting cancer to the maximally exposed individual should be calculated. The maximally exposed individual is a person who builds a home on the mine site, consumes food grown on the site and consumes water from the site.

Also, a continually increasing source term should be used for any alternative which does not include complete and long-term stabilization of the site. As erosion of the site occurs, the hazardous material is dispersed over a wider area and the source term increases in size and thereby increases in magnitude.

Isolation of Mine Waste and Protore

In response to public concern over the potential public health hazards associated with uranium mill tailings and the associated contaminated material left abandoned or otherwise uncontrolled at inactive processing sites throughout the United States, Congress passed the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), Public Law 95-604, which was enacted into law on November 8, 1978. In UMTRCA, Congress acknowledged the potential health hazards associated with uranium mill tailings and identified 22 sites that were in need of remedial action.

The EPA published an Environmental Impact Statement (EIS) (EPA 520/4-82-013-2) on the development and impacts of the standards (40 CFR Part

192) and issued final standards (48 FR 590-604) on January 5, 1983, to become effective on March 7, 1983. In developing these standards, EPA determined "that the primary objective for control of tailings should be isolation and stabilization to prevent their misuse by man and dispersal by natural forces" and that "a secondary objective should be to reduce the radon emissions from the piles." A third objective should be "the elimination of significant exposure to gamma radiation from tailings piles."

Although the mine waste and protore at the Jackpile-Paguate mine is not mill tailings, it is the parent material of mill tailings and contains many of the same properties of mill tailings. The issues that the U.S. Congress, EPA, and DOE found significant for the reclamation of mill tailings are also significant for the reclamation of the Jackpile-Paguate Uranium Mine including the potential for misuse by man and dispersal by erosion.

Mill tailings have been removed from nearly all abandoned mill tailings piles and used as a construction material or as general fill in and around approximately 4000 homes, schools, and businesses. The Federal government is now funding the UMTRA project in an effort to clean up these contaminated structures. The costs of decontaminating these structures exceeds $150 million. It is projected that this activity will prevent more than ten fatal cancers from developing every ten years.

A similar hazard could develop if measures are not taken to prevent the removal of the hazardous material, especially the protore, from the Jackpile mine site. The EPA's primary objective of isolation and stabilization for mill tailings should be applied to the Jackpile mine site. The hazardous

material, especially the protore, should be returned to the open pits and buried to prevent the removal of this material by man and erosion by natural forces.

1985 Plan

The 1985 Multiple Land Use Reclamation Plan has not been sufficiently described to enable a thorough review; however, based on the information available at this time, the plan appears to have the following deficiencies.

1. The long-term effectiveness of the phreatophytes to keep the level of the ground water from rising to the ground surface can not be guaranteed. Fire or disease could destroy the phreatophytes and the contaminated water would very quickly form ponds on the surface. This option is therefore not acceptable.

2. Diverting the Rio Paguate into the North Paguate pit would wash the contaminated water and sediment downstream and would spread contamination along the channel of the Rio Paguate and the Rio San Jose.

3. Failure to place the protore into the open pits would leave this material in locations which are very susceptible to erosion from the Rio Paguate and Rio Moquino and unauthorized removal by persons who are not familiar with the hazards associated with this material.

4. Failure to place the four feet of cover on the protore and ore associated waste would not reduce the release of radiation to acceptable levels and

would leave the site very fragile. Any human use of the site under these conditions would pose the danger of exposing the hazardous material and thereby increasing the public exposure to this hazardous material.

Highwalls

Small failures of the highwalls have occurred since mining operations concluded. These failures are occurring primarily in the shale units and are reducing the support these units provide to the overlying sandstone units. As this process continues, larger failures of the highwalls will occur and will present an increasingly severe public safety hazard. The failure of the outer portion of the shale units should be factored into the highwall stability calculations and safety factors under dynamic conditions should be calculated.

Subsidence

Pages 2-23 and 2-26 state that almost 3.5 inches of subsidence have been recorded at one monitoring station over the P10/7 Mine (1500 stope) but that consultant studies (Seegmiller, 1982) have indicated that all underground mining areas, except the P-10 decline . . . are in a "low risk" category with regard to subsidence. Predicted amounts and rates of subsidence range from 1 to 12 inches and from zero to very slow, respectively. There is some conflict in these statements, and the discussion of the impacts of subsidence (pages 3-10 and 3-12) reflect this conflict. The only mitigation measure for subsidence that is identified is the proposed bulkheading and backfilling of the P-10 decline. The effects of subsidence on areas used by the public (e.g., Highway 279) and the necessary monitoring and mitigation should be described in the EIS.

Mine Entries

Page 3-12 states that ". . . all underground openings would be backfilled so . . . ." The applicant proposes to plug the ventholes and P-7 escape way with concrete but does propose to backfill these entries. Without backfilling, slippage of the concrete plugs in these entries could pose hazards that are not addressed in the DEIS.

Exploration Boreholes

Reclamation of the exploration borehole sites and access roads is not adequately addressed in the DEIS. Specifically, what will reclamation of the sites and roads consist of (e.g., grading, seeding)?

Ventilation Boreholes (Ventholes)

Details for sealing the ventholes should be discussed and should include the following:

1. Procedures for allowing settlement of the backfill material and refilling of the ventholes prior to placing the concrete plugs.

2. Details of the belling-out and steel pinning procedures.

Future Mining

The DEIS should discuss the possibility of using special procedures to enhance the future recovery of the protore. For example, could the protore be

placed in disposal areas according to grade using radiometric scanners and could the disposal areas be surveyed to facilitate future location?

Land Use

Post-reclamation land use was used as the common denominator to develop the reclamation objectives; however, the DEIS does not provide any information on the pre-mining land uses of the site or an assessment of the impacts on post-reclamation land uses for the reclamation alternatives. This information and analysis is needed to enable the Pueblo to establish post-reclamation land uses and to evaluate how thoroughly the alternatives would reclaim the site. Issues that should be addressed for each of the reclamation alternatives are as follows:

1. What post-reclamation land uses would be inappropriate or unacceptable?

2. What types of land uses would be unacceptable for the areas underlain by underground mine workings? Where are these areas located and how many acres are involved?

3. What impact on the value of the site as a future industrial complex would be caused by the removal of the buildings?

4. What impact on the value of the site as a future industrial complex would be caused by the removal of the rail spur?

5. How does the post-reclamation value of the site compare with the value of similar but undisturbed land?

6. What were the pre-mining land uses of the site?

7. What type of institutional controls will be required to regulate post-reclamation use of the site?

8. For what length of time will the proposed post-reclamation land uses be viable? For example, how long will the open pits provide vegetation for grazing before the buildup of surface salts destroys the vegetation?

The EIS should include a discussion of each of the issues identified above, as well as a quantitative assessment of the impacts on land values for each of the reclamation alternatives.

Revegetation

The DEIS does not contain sufficient information on the vegetation reference sites to enable the reader to determine if these sites are representative of undisturbed land. The location and composition of the reference sites should be provided in the DEIS. Are the reference sites located on the mesa tops, or in the more productive valleys? Have the reference sites been disturbed or overgrazed?

Page 2-72 states that the reclaimed sites are compared to "an average reference site." The DEIS should provide data to define the "average

reference site" and should evaluate the reference sites to verify that they are representative of the area.

The data in Table 2-35 shows that none of the reclaimed waste dumps have reached ninety percent (90%) or greater of the basal cover of the reference sites, and only two sites have reached seventy percent (70%) or greater. The data also shows that the vegetation on dumps C, D, E, F, G, I, X, and Y-2 regressed between 1981 and 1982, approximately 5 years after planting. Despite this data, the DOI has proposed 5 years as an adequate duration to monitor revegetation success. The available data does not appear to support a monitoring period of only 5 years.

The results of vegetation surveys for 1983, 1984, and 1985 should be included in the DEIS.

Page 3-40 states that, "reclamation trials at the Jackpile-Paguate uranium mine have demonstrated that techniques . . . can successfully revegetate disturbed areas." As discussed above and shown in Table 2-35, the available data does not support this statement. In addition, all revegetation trials on the dump slopes, including trials with biodegradable matting, have been completely unsuccessful.

Page 3-40 states that under the applicant's proposal "all disturbed areas would be revegetated to approximate the species density and diversity of the surrounding terrain." However, the applicant's proposal is to ensure that the vegetation cover attains only seventy percent (70%) of the reference areas and

this seventy percent (70%) does not "approximate the species density and diversity of the surrounding terrain." The phrases in quotations should be reworded.

The DOI should compare the revegetation success with precipitation data for the mine area to assure that the limited revegetation success is not due to periods of above-normal precipitation.

The DEIS should discuss the number, type, and location of the trees that will be planted at the site.

Fencing

As with any large industrial complex, it is the operator's responsibility to make a reasonable effort to prevent unauthorized access and the operator is liable for any damage or injuries that are due to the operator's failure to make such efforts. The mine has only been partially fenced and Anaconda does not propose to fence the site during reclamation.

Neither the Pueblo nor individual members of the Pueblo can accept responsibility for livestock that wanders from open grazing land into the unfenced mine site and graze on recently revegetated areas. The Pueblo has offered to assist the applicant in preventing livestock access by informing members of the Pueblo who graze livestock adjacent to the mine of the grazing restrictions on the mine site, and of the severity of the damage that could be caused to recently revegetated dumps. This offer exceeds the Pueblo's responsibilities and is representative of their efforts to assist in the reclamation of the site whenever possible.

The absence of fencing around major portions of the site also makes it extremely easy for children to gain access to the site where they may come into contact with hazardous conditions, such as unstable highwalls, open mine entries, and contaminated water. While fencing of the site would not preclude unauthorized access, it does provide a warning that access is not permitted, and that hazards exist.

The DOI should require the applicant to fence the entire mine site, except where mesa slopes preclude access. Warning signs should also be placed on the fence. The DOI should also advise the applicant that it is their responsibility to prevent livestock from grazing on the site, and that if grazing does occur it will not be sufficient cause to release Anaconda from the requirement of obtaining an appropriate vegetative cover.

Table 1-3 states that reclamation will be considered complete "if livestock grazing occurred on any revegetated area" regardless of how successful the revegetation program was at the time that grazing occurred. This stipulation is completely unacceptable.

Disposition of Rail Spur

The applicant has no established right to dispose of the rail spur ballast material at the mine site. The majority of the rail spur is located off of the mining leases and the construction and use of the rail spur are governed under separate agreements with the Pueblo. If the rail spur is removed, the Pueblo may not wish to have the ballast disposed of at the mine or on the reservation.

The DOI alternatives should be modified to include leaving the rail spur in place after the removal of the Quirk loading dock and the cleanup of the contaminated areas.

Sociological Impacts

The sociological impacts on the Laguna people have been treated in an unsatisfactory manner in the DEIS.

Under the schedules identified in the DEIS, reclamation would be conducted over a three-year period. This would require the hiring and subsequent dismissal of a large work force during this period. The resulting impacts would be the creation of a short-term, boom-bust cycle which would have a severe impact on social services, housing, economic structure, and transportation networks. These impacts are not addressed in the DEIS nor are ways to mitigate these impacts.

The DEIS also does not contain adequate sociological baseline data on population distribution, social structure, community services, work force, or housing availability.

The DEIS does not discuss whether members of the Pueblo will be given preferential hiring for the reclamation operations. The percentage of the employees hired from the Pueblo should be estimated.

It may be necessary to require that reclamation be conducted over a longer time period in order to reduce the impacts on social structures, community services, economic structure and social services.

Air Quality

The DEIS does not assess the impacts on air quality during the reclamation operations and does not discuss measures to mitigate these impacts. The high level of truck traffic and blasting during reclamation will release pollutants, principally particulates, which could impact the health and welfare of the people living in Paguate. Since reclamation operations may be performed at a rapid rate, it is likely that Federal standards may be exceeded during reclamation (AMC, 1979). To mitigate these impacts, it may be necessary to conduct reclamation over a greater period of time and use water or chemical suppressants on haul roads to reduce particulate releases.

The sampling fequency for total suspended particulates should be modified to be consistent with Federal requirements to allow for a direct comparison to Federal standards.

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